

# Claims

- [c1] A method of preparing a polymer–carbon nanotube composite, the method comprising:
  - deinhibiting a monomer;
  - dispersing carbon nanotubes in the deinhibited monomer;
  - adding an initiator to the resulting dispersion;
  - polymerizing the monomer in the presence of the dispersed nanotubes to form a composite; and
  - dissolving the resulting composite in a solvent.
- [c2] The method of claim 1, wherein the carbon nanotubes are selected from the group consisting of single wall and multi–wall nanotubes.
- [c3] The method of claim 1, wherein the carbon nanotubes are pure single–walled carbon nanotubes.
- [c4] The method of claim 1, wherein the monomer is a vinyl monomer.
- [c5] The method of claim 1, wherein the monomer is methyl methacrylate.
- [c6] The method of claim 5, further comprising the step of

deinhibiting the monomer by removing the inhibitor in the methyl methacrylate monomer utilizing monoethyl ether hydroquinone inhibitor remover.

- [c7] The method of claim 1, whereby dispersing the nanotubes is affected through sonication.
- [c8] The method of claim 1, whereby the initiator creates free radicals to initiate the polymerizing step.
- [c9] The method of claim 1, wherein the initiator is substantially transparent.
- [c10] The method of claim 1, wherein the initiator is an  $\alpha$ ,  $\alpha$ dialkyl derivative of  $\alpha$ hydroxyalkylphenone.
- [c11] The method of claim 1, wherein the initiator is 1-phenyl-2-hydroxy-2-methyl-1 propanone.
- [c12] The method of claim 1, wherein adding the initiator further comprises bubbling nitrogen gas through the dispersion.
- [c13] The method of claim 1, wherein polymerizing is achieved utilizing a method selected from the group consisting of ultraviolet light, thermal heating, and ionizing gamma radiation.
- [c14] The method of claim 1, where the solvent is methylene

chloride.

- [c15] The method of claim 14, whereby a 5% solution was prepared by dissolving the composite in methylene chloride .
- [c16] The method of claim 1, further comprising the step of filtering the solvent prior to the dissolving step.
- [c17] The method of claim 1, further comprising post-curing the composite prior to the dissolving step.
- [c18] The method of claim 1, further comprising isolating the nanocomposite by removal of the solvent after the dissolving step.
- [c19] A method of preparing a polymer-carbon nanotube composite, the method comprising:
  - deinhibiting a methyl methacrylate monomer;
  - placing single-wall carbon nanotubes into the deinhibited monomer, forming a nanotube mixture;
  - sonicating the nanotube mixture for a duration sufficient to disperse the nanotubes in the monomer;
  - placing the dispersed mixture into a reaction vessel;
  - adding a 1-phenyl-2-hydroxy-2-methyl-1 propanone initiator to the reaction vessel;
  - bubbling nitrogen gas through the mixture for a duration sufficient to allow for a nitrogen environment in the

mixture;

polymerizing the monomer in the presence of the dispersed nanotubes to produce a composite; and dissolving the resulting composite in methylene chloride.

- [c20] The method of claim 19, whereby a monomethyl ether hydroquinone inhibitor is removed from the methyl methacrylate monomer to deinhibit the monomer.
- [c21] The method of claim 19, where the single-walled carbon nanotubes are 0.26% pure single-walled carbon nanotubes.
- [c22] The method of claim 19 wherein polymerizing is achieved utilizing a method selected from the group consisting of ultraviolet light, thermal heating, and gamma radiation.
- [c23] A substantially optically transparent polymer carbon nanotube composite produced according to the process of claim 1.
- [c24] A substantially optically transparent polymer carbon nanotube composite produced according to the process of claim 19.